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THE Bureau of Economic and Business Research of the Temple University School of Business and Public Administration was organized to provide a vehicle for stimulating and coordinating analytical studies. Its primary objectives include (1) service to the alumni as well as to the faculty and students of the University by bringing to their attention pertinent developments in the world of business, and (2) service to business and government by making contributions to the solution of specific problems. To this end, the Bureau both carries on specialized research and publishes quarterly the **Economics and Business Bulletin**, containing some of the significant results of its current studies.

The reader's appraisal of the **Bulletin** and comments upon it are solicited. The Bureau also will appreciate receiving suggestions and requests for particular studies.

The opinions and views expressed in the articles contained in this **Bulletin** are those of the writers and cannot be construed as the official opinions or policies of the School of Business and Public Administration.

Vacation Patterns Among Philadelphia Families

by MYRON S. HEIDINGSFIELD*

The annual vacation has become a national institution and has given rise to a vigorous and competitive industry with many social and economic implications. Much data have been collected on the vacation patterns of citizens throughout the country, but little is known about the Philadelphia community. This article deals with the vacation patterns — places, durations, and other facets—peculiar to vacationing Philadelphians.

THE population of the United States has been enjoying an increasing standard of living together with a significant increase in leisure time. As a result, the annual vacation has taken its place as an important part of the pattern of family activity. It is estimated that annual expenditures for vacation now amount to approximately twenty billion dollars with resulting effects on purchases of clothing, luggage, cameras, sporting equipment, transportation, advertising, and construction. Vacations, thus, now support a major service industry in our economy.

As in other industries which are characterized by keen competition, the collection of information as a basis for promotion has become common practice. Many organizations directly or indirectly related to pursuing the vacationer have made important studies in this field. However, no specific study has been made of the vacation patterns of the Philadelphia community, and this became the basis for the tenth annual research project[1] of the Temple University Marketing Department which was conducted by the Market Research class of 1957.[2]

According to the dictionary, vacation means "freedom or release from business, duty or activity—a period of suspension of work or activity." For the purposes of this study this definition has been accepted with the additional qualification that the duration of the time off be three days or more.

The objectives of this study were to uncover the patterns of vacation activity—specifically, where they were taken, when they were taken, the methods of transportation used, and the amounts of time involved.

Method

A probability sample was constructed for Philadelphia County, which means that the blocks and dwelling units were selected at random. In accordance with this pattern, 291 dwelling units were randomly selected from a sample of 50 randomly chosen blocks. In order to maintain randomness, individuals who were not at home at the first call were automatically scheduled for a second and third call back on different days and different hours. Some 50 respondents could not be reached after this third call back. This resulted in a sample of 241 respondents.

Questionnaire construction followed

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[1]Previous studies include: "Why Do People Shop in Downtown Department Stores?"; "A Study of the Social Impact of Television on Philadelphia Families"; "The Suburban Shopping Center"; "The Penetration of Discount Buying Among Philadelphia Families"; "Buying Habits of Philadelphia Consumers"; "An Expermental Method for Measurng Effectiveness of Advertising"; "The Impact of Children's Television Programs on Purchasing"; "The Impact of Trading Stamps on the Philadelphia Market."

[2]The class roster included: Misses: D. Gombert; R. Horowitz; M. Moss; H. Veihl; T. Diplano. Messrs: B. Bortner, J. Casadonte; P. Clark; P. Foster; S. Frebowitz; B. Goldberg; C. Hamburg; J. Hammell; M. Katz; B. Kodroff; G. Kushner; J. Merback; D. Meyer; D. Mokrynski; E. Paige; G. Popper; F. Shaffer; T. Silverman; T. Taylor; J. Wiseman; M. Yablonsky.

accepted procedures wherein a topical outline was drawn up and pretested among a sub-sample of respondents. From this, a pretest questionnaire was designed which was again used with another sub-sample of the population. Based upon these findings a revised questionnaire was designed, and this became the data form used in the study.

VACATION PATTERNS

Among the sample of respondents questioned it was found that approximately 60 percent had taken vacations in the past three years. This closely approximates the pattern of vacation travel reported by the Research Department of the Curtis Publishing Company[3] which indicated that 65.5 percent of their national panel took vacation trips.

Of the Philadelphians who reported that they had not taken a vacation, the most important reason given was the cost involved. This accounted for about half of that group. Other important reasons seemed to be insufficient time or illness. It is interesting to note that approximately 10 percent of those who did not go on vacation indicated that they had no desire to do so.

Of the group who took vacations, a little less than 70 percent indicated that the most propitious time for them was between June and August, while some 12 percent indicated September to December. This did not differ significantly from the findings reported in the 1956 national survey made by the Curtis Publishing Company which showed a division of 62 percent and 16 percent for summer and fall, respectively.

Location

Approximately three-fourths of the Philadelphia vacationers spent their vacations entirely away from home. However, there was an important group who indicated that they had spent their entire vacations at home.

It would be expected that of those Philadelphians who went away from home, a majority would go to the seashore. This was indicated by the fact that 41 percent of the vacationing Philadelphia families responding did go to such a place. The major reasons for these choices seemed to be a liking for some particular feature, but these were not described. Additionally, there seemed to be a certain amount of inertia related to choice as evidenced by the fact that "habit" was given as the second most important reason for taking the family to the shore. Another reason seemed to be that it was an ideal place in which to visit friends.

The acceptance of the southern part of this country as a vacation resort was indicated by the fact that some 25 percent of the sample reported that they went South. Of the total, some nine percent went to Florida. The primary reason given for choosing a southern vacation was to visit relatives.

New York (and it was not indicated whether it was the state or the city) was the third most important vacation spot for Philadelphians. This included the group which visited the mountain regions of the state. The remainder of the group responses were distributed throughout the Midwest, the Poconos, New England, Canada, and outside of the continental United States.

When the total number of responses were tabulated as to why a particular vacation place was chosen, it was interesting to learn that approximately 42 percent of the sample revealed as their reason that they were visiting relatives or friends. This corresponds closely with the percentage found in the category, "Lodging Used at Destination," by the Curtis Publishing Company survey.

Approximately one-fifth of the Philadelphia sample gave no specific reason for choosing a particular vacation spot. The remainder indicated that they either liked a certain feature, went there out of habit, or went for a rest. An insignificant percentage of the people re-

[3]Research Department, The Curtis Publishing Company, **The Travel Market**, a nation wide study, 1954.

ported that they chose the spot as a basis for sight-seeing or because it was inexpensive.

Of the entire group which reported taking a vacation, a little more than 60 percent revealed that the entire family went along as a unit. Some 22 percent indicated that they took their vacations alone. The remainder was split up among fragments of the family such as both adults without children.

Of the total number of the respondents who had taken their vacations entirely away from home, almost 98 percent said they planned to repeat this experience on their next vacations. However, only some 40 percent of the group indicated that they would return to the same vacation spots.

Transportation and Duration

The most important means of transportation for vacations seemed to be the automobile. This category accounted for approximately 67 percent of the answers. The train was used in about 16 percent of the cases while airplanes and buses accounted for 9.3 percent and 8.5 percent, respectively. These may be compared with the findings in the Curtis report wherein it was indicated that automobiles accounted for 85.5 percent; trains, 12.8 percent; airplanes, 7.9 percent; and buses, 5.5 percent. Philadelphians only used water transportation in 1.6 percent of the cases, while the national study indicated 1.8 percent for this method. Thus, there seemed to be some significant differences in transportation responses.

The two-week vacation has become a stable feature of the American vacation pattern. In this survey among Philadelphians, this was still the most frequently reported vacation period, with a one-week vacation taking second place. However, the notable difference between this and other surveys indicates that the third most frequently reported vacation period was four weeks or more. The three-week and one-week vacations fell into fourth and fifth places, respectively.

Intent

One of the most difficult problems in marketing research is to measure intent. However, despite the characteristic errors of such a measurement it was decided to obtain the information. The entire sample group was asked, "Do you plan to take a vacation before the end of the year?" Approximately 67 percent indicated that they would, and of that group, 85 percent planned to spend their vacations away from home.

When questioned about the locations proposed for their vacations, the primary choice was the seashore. The second choice was the Southern part of the United States which included Florida. At this juncture, the pattern departed from previous experience. A part of the sample indicated that their third choices would be New England, with Canada and the Midwest following in that sequence. It is interesting to note that almost three times the number of people said that they planned to go to New England on their forthcoming vacations as have reported going there on their last vacations.

When asked about the duration of future vacations, the pattern repeated itself, wherein the two-week vacation was most frequently reported with the one-week and four-week period indicated as the second and third significant items.

In order to rouse the imagination of the respondents, each was asked, "If you had all the money and time in the world to take a vacation, where would you like to go?" The most attractive vacation plans for people under these fanciful conditions were Europe, California, Florida, tours of the United States, and Hawaii. Very few of the respondents indicated that they would go to Bermuda, Israel, Mexico, or the West Indies. One of the more interesting findings was that, of the entire sample, almost 16 percent either did not know where they would like to go or did not respond to the question.

Patterns by Residence

In undertaking this study, it was felt that it might be interesting to cross tabulate the findings by the geographical locations of the respondents. Therefore, the number of responses were tabulated by the four usual divisions of the City of Philadelphia, viz., southeast, southwest, northeast, and northwest.

It should be remembered that any tabulation such as this will result in subsamples which are fairly small and quite inaccurate. However, there may be crude indications which have some value for those who are interested in patterns of vacation behavior.

Of the four sections in the city only the southeast showed a preponderance of respondents who had not taken vacations in the past three years. The data for the remaining three sections revealed that a majority of the people had taken vacations.

No important behavior patterns were found among any of the sections when the reasons for not taking vacations were cross tabulated. In all four sections the two most important reasons given were cost or lack of time.

It is often said by market researchers who practice in this city that some evidence of income level is indicated by place of residence. This statement may be borne out by a cross tabulation which revealed that the heterogeneity of vacation spots varied directly with the changing income level as indicated by residence. For example in the southeastern part of Philadelphia, there were only four places to which vacationers went, while in the southwestern section there were seven, in the northeastern, eight and in the northwestern, fifteen. However, in every case the first choice was the seashore.

With regard to the future, a majority of respondents in every section of the city indicated that they were planning to take vacations in the coming year. However, there was a greater percentage of uncertainty among those who lived in the northeastern and northwestern sections.

CONCLUSIONS

The vacation patterns among Philadelphia families seem similar in many aspects to the patterns established by individuals throughout the United States; although their choices of vacation spots obviously differ.

Traditionally, it appears that the Philadelphian has been going to the seashore, but it would seem that there is some shift away from this location to the South and possibly to New England. The remarkable finding was that an insignificant percentage of this group indicated that they had gone to the Poconos—a resort almost as close as the Atlantic shore. This may be the result of tradition and inertia which seem to be two of the major reasons for choosing a particular vacation spot. However, the mobility and gregariousness of the Philadelphia community is pointed up by the fact that a large percentage reportedly chose their vacation spots simply because they were visiting relatives or friends. Evidently this is a commonplace situation throughout the United States.

The automobile showed its predominance as the major means for family transportation with other transportation media appearing less significant.

It would appear to the writer that if the Atlantic shore is going to hold its position as a primary vacation spot for Philadelphians, and if the resorts located in the Poconos are going to attract more people from this community, it would behoove each group to participate in carefully devised advertising and public relations programs based upon detailed and continuing study of the Philadelphia vacation market.

A General Model for Inventory Decisions

by JOHN C. SEVIER*

The present basic model for making inventory decisions, either man-made or machine-made, involves several assumptions that by their very nature preclude a reliable decision. The implicit error has a functional nature, and the consequences of this error grow with the size or value of the inventory. By the functional nature of the error it is possible to generate a correction factor, mitigating the consequences of this error.

IN practice, as well as in teaching, determination of the optimum size of the inventory to be held, and the economic-lot size for ordering materials to be added to the inventory are two of the important problems of management with which one must be concerned. Since the inventory costs are part of the total costs of production, and costs must be minimized irrespective of the competitive or noncompetitive position of the firm, a method for making inventory decisions is as essential as a method for making other managerial decisions. Whatever the basis, the model developed must be sound or the resulting decisions will necessarily fail to contribute to the minimization of the costs of production.

THE MODEL FOR INVENTORY DECISIONS

The basic principle states that the total costs of an inventory can be minimized when the procurement costs are equated to the carrying and storage costs. This principle can be illustrated in several ways. For an algebraic demonstration of the principles, where

P = the total annual costs of procuring additions to the inventory,

p = the preparation costs per order placed,

X = the lot-size of the order to be placed,

R = the annual production requirements,

C = the annual costs of carrying the inventory,

c = the unit carrying costs of the average inventory, and

s = the unit storage costs of the maximum inventory,

P+C will be minimized when P = C. Therefore,

$$P = (R/X)p$$

or

The total costs of procuring units for addition to the inventory equal the annual production requirements divided by the size of the order placed, and multiplied by the preparation costs per order.

$$C = (X/2)\ (c) + (X)\ (s)$$

or

The total carrying costs equal the average inventory multiplied by the unit carrying costs plus the maximum inventory multiplied by the unit storage costs.[1]

Thus: $(R/X)p = (X/2)\ (c) + (x)\ (s)$

Solving for the optimum lot-size:

$$X = \sqrt{2Rp/\ c+2s}$$

Therefore, inventory costs on an annual basis can be minimized by placing orders the lot-size of which is determined by the square root of twice the annual production requirements multiplied by the procurement costs per order placed, and divided by the sum of the unit carrying costs and twice the unit storage costs.

Execution of the Model

Determination of the economic-lot size is possible tabularly, algebraically, and graphically. Each of these approaches follows.

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[1]The carrying costs and storage costs may be expressed in cents per unit, or as a percent of the value of the average and maximum inventory. In this latter case, the value per unit (v) would have to enter into the denominator of the radical.

TABULAR EXECUTION

Lot-Size	500	750	1,000	1,500	2,000	2,500
Number of Orders	20.0	13.3	10.0	6.67	5.0	4.0
Maximum Inventory	500	750	1,000	1,500	2,000	2,500
Minimum Inventory	0	0	0	0	0	0
Average Inventory	250	375	500	750	1,000	1,250
Storage Costs	$ 10.00	$ 15.00	$ 20.00	$ 30.00	$ 40.00	$ 50.00
Carrying Costs	15.00	22.50	30.00	45.00	60.00	75.00
Total (c+s)	$ 25.00	$ 37.50	$ 50.00	$ 75.00	$100.00	$125.00
Procurement Costs	$100.00	$ 66.50	$ 50.00	$ 33.35	$ 25.00	$ 20.00
Total Costs (P+C)	$125.00	$104.00	$100.00	$108.35	$125.00	$145.00

For this and the following executions the following values apply.

p = $5.00 per order placed

R = 10,000 units per year

c = 6¢ per unit based upon the average inventory

s = 2¢ per unit based upon the maximum inventory

The execution of the principle for making inventory decisions concludes that the optimum lot-size to be ordered would be 1,000 units. With annual production requirements of 10,000 units, ten orders per year would have to be placed. Further, under these cost conditions, the total costs of the inventory are minimized, and, as will be noted, procurement and carrying costs are equal.

The Algebraic Execution

$$X = \sqrt{2Rp/\ c+2s}$$

$$X = \sqrt{2\ (10{,}000)\ (\$5.00)\ /\ [6¢ + 2(2¢)]}$$

$$X = \sqrt{\$100{,}000/10¢}$$

$$X = 1{,}000 \text{ units}$$

The Graphic Execution

The graphic presentation is made from the tabular presentation in the standard manner using the cartesian coordinate system. The one variance in the text presentation of the graphic approach to inventory decision making is to reverse the plotting of the two cost schedules. Procurement costs are usually presented as a linear ascending schedule, and carrying costs are usually presented as the hyperbola. The solution is not affected by this reversal. (See Chart One)

THE MODEL

CONSISTENCY

The model consists of the relationship of two groups of costs, and the summation of the two groups of costs for each of the alternative values for the independent variable.

The first group or schedule of costs is the carrying costs with the independent variable being the lot-size, and the total carrying costs being the dependent variable. The schedule actually combines two ulterior cost schedules. The storage costs are a function of the maximum size of the inventory to be carried and consists of the pro-rata space, heat, light, taxes, insurance, supervision, safety and other charges. The costs at any one time are a fixed rate per unit of maximum inventory. This rate may be expressed in terms of the number of units in the inventory, in which case the costs are expressed in dollars; or the rate may be expressed in terms of the value of that inventory, in which case the costs are expressed as a percent of that value.

Also included in the total carrying costs of the inventory is the schedule of costs that are related to the average inventory, which are the complements of the costs mentioned in connection with maximum inventory. These costs at any one time are a fixed proportion of the average inventory, or a fixed charge, in dollars, per unit of average inventory.

These two schedules, when combined and related to the independent variable (lot-size) conform to the linear function

the generalized equation for which fits the following form:

$$Y = a+bX$$

The second major group of costs is the procurement costs. In this case, the independent variable is the lot-size, and the total procurement cost is the dependent variable. This schedule includes clerical, supervision, overhead and other costs associated with preparing each order. These costs do not vary on a per-order basis over short periods of time. They do move upward over prolonged periods of time. On a per unit basis, however, they decline considerably as the size of the order increases. The procurement cost schedule, therefore, conforms to the rectilinear hyperbola, the asymptotes of which are the x-axis and the y-axis, the form of the equation being:

$$Y = k/X$$

The common ordinate and abscissa for these two equations can be obtained easily. By setting the two equations equal to each other and solving for X, assuming that the value of "a" in the linear equation is assigned a value of O, the result is:

$$X = \sqrt{k/b}$$

Similarly, to get the ordinate value for the common abscissa, the equations have to be reformulated to determine x rather than y, then set into equality, and resolved. The common ordinate, still assuming "a" to be equal to O, is:

$$Y = \sqrt{kb}$$

The summation of these two cost schedules conforms to a complex curvilinear function with a "U" shape, the generalized equation of which is as follows:

$$Y = a+bX+k/X$$

To obtain the abscissa for the minimum ordinate, by calculus, the first derivative must be found, then Y′ is set to a value of O, and the equation is solved for the value of X.

$$\text{The first derivative: } Y' = b - \frac{k}{X^2}$$

$$\text{Solving for X: } X = \sqrt{k/b}$$

Solving for the minimum ordinate, it is found to be $2\sqrt{kb}$ closing the logic of the principle of inventory decision making.

Thus, the model is sound. The increasing costs of carrying the inventory as the lot-size is increased and the decreasing costs of ordering the materials, on a per-unit basis, find a common point where the two cost schedules are equal for a particular lot-size. The summation of these two cost schedules has a minimum point, and the abscissa of that point coincides with the abscissa of equality in procurement and carrying costs, and further, the minimum ordinate is exactly twice the ordinate of the equality in procurement and carrying costs.

Critique of the Model

There is an implied assumption in the model. It is assumed that the inventory carrying costs as a reflection of the fluctuations in the inventory are completely elastic upward and downward. That is, it is assumed that the number of units in the inventory can fall to zero units. Only as long as this is true can the schedule of carrying costs pass through the origin of the x-axis and y-axis. As long as this is possible, the principle holds true. If a "fixed" cost is present, that is, a reserve inventory must be held, then the abscissa of equality, and the abscissa of minimum total costs diverge.

An inconsistency must develop in every decision inasmuch as no firm can afford to allow any inventory to fall to zero. Timing of order placement, timing of delivery, and other time-consuming factors cannot be predicted with certainty. No firm can risk suspension of production because of an absence of materials on hand. There must be some quantity of materials on hand as a reserve stock sufficient in size to take care of any delay in receipt of the units to be added to the inventory.

Defensively, the divergence from true minimization of the total costs of administering the inventory is often rational-

ized in several ways. Among the defenses raised is the idea that large-scale purchases result in lower costs per unit of additions to inventory, and this saving will offset the error. It is also stated that it is not possible to schedule costs exactly, or that procurement costs are uncertain, and so "minor" errors in the model are unimportant. Additionally, it is stated that the model is sound as to the "controllable" costs of inventory and the "uncontrollable" costs are but a small part of the total costs. However, a model must stand or fall on its own merits.

The Model With Fixed Costs

The same values for the earlier demonstrations of the simple model are used with one exception. It is assumed that a reserve inventory of one hundred units is required to be on hand.

THE TABULAR PRESENTATION

Lot-Size	500	750	1,000	1,500	2,000	2,500
Number of Orders	20.0	13.3	10.0	6.67	5.0	4.0
Reserve Inventory (units)	100	100	100	100	100	100
Maximum Inventory (units)	600	850	1,100	1,600	2,100	2,600
Minimum Inventory (units)	100	100	100	100	100	100
Average Inventory (units)	350	475	600	850	1,100	1,350
Storage Costs	$ 12.00	$ 17.00	$ 22.00	$ 32.00	$ 42.00	$ 52.00
Carrying Costs	21.00	28.50	36.00	51.00	66.00	81.00
Total (c+s)	$ 33.00	$ 45.50	$ 58.00	$ 83.00	$108.00	$133.00
Procurement Costs	$100.00	$ 66.50	$ 50.00	$ 33.35	$ 25.00	$ 20.00
Total Costs (P+C)	$133.00	$112.00	$108.00	$116.35	$133.00	$153.00

The minimization of total costs has been achieved in this table. However, the equality of the carrying and the procurement costs has not been achieved. Accordingly, an intensive analysis of the interval between the lot-sizes of 750 and 1,000 units must be made.

ADDITIONAL TABULAR PRESENTATION

Lot-Size	900	925	950	1,000	1,050
Number of Orders	11.1	10.8	10.5	10.0	9.5
Reserve Inventory (units)	100	100	100	100	100
Maximum Inventory (units)	1,100	1,025	1,050	1,100	1,150
Minimum Inventory (units)	100	100	100	100	100
Storage Costs	$ 20.00	$ 20.50	$ 21.00	$ 22.00	$ 23.00
Carrying Costs	33.00	33.75	34.50	36.00	37.50
Total (c+s)	$ 53.00	$ 54.25	$ 55.50	$ 58.00	$ 60.50
Procurement Costs	$ 55.55	$ 54.00	$ 52.5+	$ 50.00	$ 47.5+
Total Costs (P+C)	$108.55	$108.25	$108.+	$108.00	$108.+

Merely from the tabular data it becomes apparent that, if the principle is followed, the economic-lot size to be ordered is 925 units, plus or minus a small error. That is, this is the quantity to be set by the equality of the procurement and carrying costs. However, the point of minimum total costs (P+C) is not found at this point, but at the point of lot-size 1,000 units. If a decision to order 925 units were to be made, a margin of error in minimizing the total costs of the inventory would amount to 7.5 percent in the estimation of the desirable optimum lot-size. This seems rather small, in that the absolute error in total costs of administering the inventory would be but $0.25 ($108.25 minus $108.00). However, the data have been simplified for illustration, and as costs increase or the size or value of the inventory increases, the absolute size of the error increases. This tends to make the error more relevant.

The Algebraic Presentation. The formula for the determination of the optimum lot-size differs considerably in the reserve and nonreserve situations. With a reserve present, the equation assumes more than a second degree format, requiring use of the alternative method for extracting the root. The same relationships prevail for this demonstration as in the tabular method, "r" designating the reserve inventory.

$$C = Xc/2 + Xs + (c+s)r$$

or

The total carrying costs equal one-half the lot-size multiplied by the unit carrying costs plus the lot-size multiplied by the storage costs plus the reserve multiplied by the sum of the unit storage and carrying costs.

$$P = Rp/X$$

or

The total precurement costs equal the annual requirements multiplied by the procurement costs per order and divided by the lot-size.

Setting these two equations to equality and solving for lot-size:

$$X = \frac{-(c+s)r \pm \sqrt{[(c+s)r]^2 \; 4 \; (c/2+s) \; (Rp)}}{2(c/2+s)}$$

This gives two roots:

$X = 923$ and $X = -1083$

Optimum Lot-Size = 923 units

Taking the first derivative of the total cost schedule, setting the derivative equal to zero and solving for the optimum lot-size will give the quantity to be ordered that minimizes the total costs of the inventory.

Total Costs =

$$(c+s)r + [(c+2s)/2]X + Rp/X$$

First Derivative =

$$[(c+2s)/2] - (Rp/X^2)$$

Solving for X:

$$X = \sqrt{\frac{Rp}{(c+2s)/2}} = \sqrt{\frac{2Rp}{c+2s}}$$

Substituting values: X = 1,000 units.

It becomes manifestly clear, algebraically, that the former method generates an order-size that does **not** minimize the total costs of an inventory, while the latter method does.

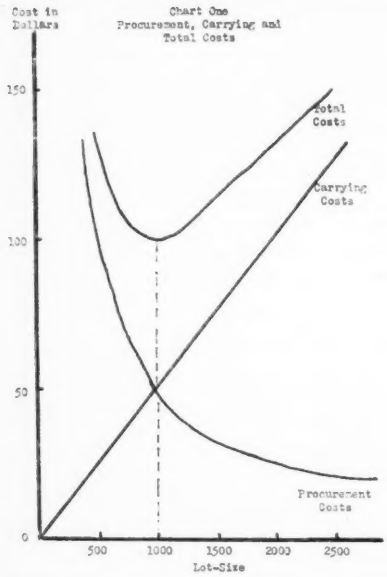
The Graphic Presentation. Using the data in the tabular presentation, with a reserve present, the plotting of the carrying costs, with a reserve element, and the procurement costs bring an intersection of the two schedules in the neighborhood of the abscissa for 925 units. The plotting of the total costs sets the minimum for the curve at 1,000 units. Thus, the inconsistency of the basic principle becomes visually apparent. (See Chart Two).

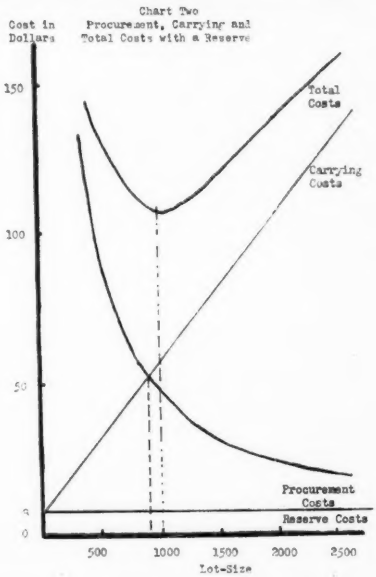
RATIONALIZATION OF THE PRINCIPLE

The basic aim of the principle for management of inventory costs is to minimize the costs of the inventory. The total costs of the inventory fall into two basic patterns. The first pattern is that of a procurement cost schedule which declines steadily on a per unit basis, conforming to a rectilinear hyperbole. The second pattern is that of the carrying cost schedule which increases constantly. The aggregate of these two patterns is in the form of a U-shaped curve.

To the extent that the two contributing cost schedules both approach zero assymptotically, in the case of the procurement costs, and the carrying costs can fall to zero, the basic principle that the total costs will be minimized when these two schedules are equaled holds true. This is but one special case, not a generalized situation.

The presence of a reserve acts to raise the carrying costs of the inventory so that an intersection occurs in the positive portion of the y-axis. Since the procurement cost schedule remains unchanged, the intersection of the two cost schedules must move upward and inward to the y-axis, causing a decline in the size of the order to be placed. However, as a "fixed" cost is added by the presence of a reserve, the total cost schedule is translated vertically alone. The axis of minimized costs **does not move laterally.** (See Chart II.) Inasmuch as this pattern prevails, it becomes





manifestly improper to base the determination of the economic lot-size upon the equality of the two contributing cost schedules.

THE MODEL RESTATED

The total cost of an inventory is determined by the costs of procuring units for that inventory and by the costs of carrying the resulting inventory. The configuration of the total costs schedule in all cases is as follows:

$$Y = a+bX+k/X$$

or

The total costs of the inventory are equal to the carrying costs of the reserve inventory (a) plus the carrying costs of the fluctuating portion of the inventory (bX) plus the procurement costs of the inventory additions to meet the annual production requirements (k/X).

The minimum point abscissa (the economic lot-size) can be obtained by determining the first derivative of this total cost curve, setting the equation equal to zero, and solving for the independent variable.

$$Y' = b- (k/X^2)$$

When $Y' = 0$

$$X = \sqrt{k/b}$$

$$X = \sqrt{2R\ (p/c)}$$

or

The economic lot-size that will minimize the total costs of an inventory is determined by the square root of twice the annual production requirements multiplied by the ratio of the procurement costs per order and the unit costs of carrying the inventory.

Tax Advantages of Investment Loss Realization

by JACK E. GELFAND*

The recent decline in stock prices will result in paper losses for many investors. Tax considerations may make it advisable to turn these paper losses into realized losses. The circumstances under which realized losses will result in tax benefits together with some measurements thereof are discussed here.

OUR federal individual income tax laws make the judicious realization of capital losses an integral part of individual income tax planning. Generally, during the months of November and December a large volume of shares of stock are traded for the purpose of establishing losses on investments. The decline in securities prices that characterized the 1957 investment markets undoubtedly has accelerated this practice in the later months of this year. At least, it is suspected that "tax-selling" is the motive for a large portion of current common stock transactions on the securities markets throughout the country.

The purposes of this paper are to review the tax laws that affect investor-taxpayer decisions to buy, sell, hold, or switch securities; to indicate the investment strategy that may be employed under these laws to minimize tax liabilities; and to measure the tax benefits that may, under various circumstances, accrue to taxpayers in different tax brackets.

The tax strategy underlying capital-loss realization hinges on the special tax treatment of capital gains and losses.[1] Long-term capital gains are taxed at preferential rates for two reasons. First, a capital gain may be the result of appreciation in value of an asset over a period of time. The graduated rates of a progressive income tax, therefore, could possibly have greater impact on income that has been "bunched-up" into one year, than if the appreciation had been taxed year by year as it occurred. The second reason is to eliminate the lock-in effect. This results from the fact that the increased value of a capital asset is not subject to taxation until it has been realized. Since the realization of a gain may be delayed indefinitely at the discretion of the taxpayer, taxes may be deferred, causing the government to lose revenue.[2] Preferential tax treatment is thus granted capital gains receipts in order to keep investments from being "locked-in."

Long-term capital gains and losses are those resulting from the sale or exchange of capital assets held six months or more. If the asset is held for a shorter period than that, the gain or loss is considered **short-term.**[3] Long-term losses are subtracted from long-term gains to arrive at the net long-term gain or loss. Short-term losses are subtracted from short-term gains, and the difference is known as the net short-term gain or loss.

The importance of distinguishing between long-term and short-term gains and losses lies in the fact that only long-term capital gains are afforded special treatment. Net short-term capital gains are taxable at ordinary income rates.

METHODS OF TREATING GAINS AND LOSSES

There are two methods of treating net long-term capital gains and the taxpayer has the option of selecting that method

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[1]**Internal Revenue Code of 1954,** Sections 1201-1241. Hereafter references to the **Internal Revenue Code** will be referred to by Sec. followed by the section number.

[2]The capital gains tax may not only be deferred—it can be completely avoided. If the taxpayer were to keep his investment until his death, no capital gains tax need be paid by either the taxpayer or his heirs. The basis of the property in the hands of the heir is the fair market value at the time the transfer was made. Sec. 1014.

[3]The rule for determining the length of the holding period is to exclude the day of acquisition of the asset and to include the day of the sale or exchange. **Weir,** 10 TC 996 (1941).

that results in the lesser tax.[4] In the first method, the taxpayer includes in his gross income the excess of his net long-term capital gains over his net short-term capital losses.[5] He then deducts 50 percent of the capital gain from gross income to arrive at adjusted gross income.[6] He may then take the standard deduction or itemize his deductions, subtract his personal exemptions, and apply the ordinary income tax rates to his taxable income. Under this method, the capital gain is taxable at roughly half the ordinary income rates.

In the alternative method, after arriving at taxable income by the former method, an amount equal to 50 percent of the capital gain is subtracted from taxable income. This elimates the portion of the capital gain that was to be taxed at ordinary income rates under the first method. To the tax applicable to the remaining taxable income at ordinary rates is added a tax of 25 percent of the capital gain. This is the total tax payable.[7] As long as the taxpayer has to pay any tax at all, the tax rate on the capital gain will range from a minimum of ten percent to a maximum of 25 percent.

What happens, however, when combined capital losses exceed combined capital gains?[8] In that case, the excess of losses over gains is deductible from ordinary income to the extent of $1,000, or to the amount of taxable income for the year, whichever is smaller. If capital losses exceed this allowance, the remainder may be carried forward for the next five years as a short-term capital loss and, as such, will be deductible from subsequent long- and short-term capital gains.[9] The capital loss deduction from ordinary income is limited to a total of $6,000 ($1,000 for the year of the loss and $1,000 for each of five years of carry-over).

The tax benefit of realizing losses on investments, thus, hinges on the type of receipts against which the losses would be applied. Whenever possible, losses should be realized in order to offset income taxable at ordinary rates. Since long-term capital losses are first applied against long-term capital gains, then from the purely tax planning aspect, these losses should not be realized during a tax period when long-term gains are abundant. Rather they should be delayed to a time when long-term gains are small.[10] A taxpayer with both long-term and short-term capital gains may also benefit from realizing sufficient short-term losses to offset his short-term gains. If they were allowed to run long enough to become long-term losses, they would be applied against the more lightly taxed long-term capital gains, or else would be limited in their deductibility from ordinary income.

If a taxpayer has losses that would otherwise be applied against long-term capital gains, it would benefit the taxpayer to realize additional short-term gains on investments that do not hold much promise for additional gains in the future. Thus, the short-term gain can be realized and the payment of taxes at ordinary rates can be avoided on those gains.[11]

Tax Advantages Illustrated

The tax advantages of loss strategy may seem to be too small to bother about when it is considered that losses can only be applied beyond gains to a maximum of $1,000 for any year and a total of $6,000 when the five-year carry-over period is included. However, the after-tax value of the preferential tax treatment of

[4]Sec. 1202.

[5]In the discussion that follows, this difference between net long-term capital gain and short-term capital loss will be referred to as the capital gain.

[6]Sec. 62.

[7]Sec. 1201.

[8]Combined capital losses are both long-term and short-term.

[9]Sec. 1212.

[10]It is assumed here that there are no other compelling reasons for realizing the loss. Tax considerations should not stand in the way of sound investment principles in portfolio management unless the tax saving is more valuable than the anticipated gain of the investment.

[11]Nathan Wallfish, "Some Aspects of Capital Gains Planning," **Tulane Tax Institute**, 1954, New York, Matthew Bender, 1954, p. 264.

Table I

AN ILLUSTRATION OF THE
TAX ADVANTAGES OF CAPITAL GAINS AND LOSSES OFFSET BY ORDINARY INCOME
UNDER THE U.S. INTERNAL REVENUE CODE OF 1954

(1) Taxable Income Class	(2) Marginal Tax Rate (r)	(3) Per $1 of Capital Gains (R)	(4) Net Cost Per $1 of Net Loss (L)	(5) Differential Gain (G = R - L)	(6) Gross Income Equivalent of Column 5 (E)
Over but Not Over					
$ 0-$ 2,000	.20	$ .900	$ .80	$ .100	$0.125
2,000- 4,000	.22	.890	.78	.110	0.167
4,000- 6,000	.26	.870	.74	.130	0.176
6,000- 8,000	.30	.850	.70	.150	0.215
8,000- 10,000	.34	.830	.66	.170	0.258
10,000- 12,000	.38	.810	.62	.190	0.306
12,000- 14,000	.43	.785	.57	.215	0.376
14,000- 16,000	.47	.765	.53	.235	0.444
16,000- 18,000	.50	.750	.50	.250	0.500
18,000- 20,000	.53	.750	.47	.280	0.596
20,000- 22,000	.56	.750	.44	.310	0.704
22,000- 26,000	.59	.750	.41	.340	0.830
26,000- 32,000	.62	.750	.38	.370	0.973
32,000- 38,000	.65	.750	.35	.400	1.144
38,000- 44,000	.69	.750	.31	.440	1.421
44,000- 50,000	.72	.750	.28	.470	1.678
50,000- 60,000	.75	.750	.25	.500	2.000
60,000- 70,000	.78	.750	.22	.530	2.407
70,000- 80,000	.81	.750	.19	.560	2.946
80,000- 90,000	.84	.750	.16	.590	3.688
90,000-100,000	.87	.750	.13	.620	4.772
100,000-150,000	.89	.750	.11	.640	5.818
150,000-200,000	.90	.750	.10	.650	6.500
200,000 and Over	.91	.750	.09	.660	6.667

capital gains increases while the after-tax costs of losses offset against ordinary income decreases with the increased taxable income bracket of the taxpayer. This is illustrated in columns 3 and 4 of the accompanying table.

Table I measures the tax advantages of loss realization under various assumptions. Column 1 is the "taxable income" classes to which the marginal tax rates in column 2 are applicable. Column 3 measures the net receipts of one dollar of capital gains after payment of capital gains taxes. It is assumed in calculating this figure that the most advantageous method of calculating capital gains is used. Thus, the tax rate applicable to the capital gain are taken to be one-half the tax rates applicable to ordinary income, up to the .50 marginal tax rate bracket. Beyond this, the alternative method of taxing capital gains at the .25 maximum rate is used. The net receipts figures in column 3 are equal to one dollar, less the tax which is either $\frac{r}{2}$ or .25, whichever is lower. The net receipts (R) is thus determined by the formula $R=(1-\frac{r}{2})$ for marginal tax brackets up to the .50 rate, and by the formula R = (1- .25) for marginal tax brackets beyond the .50 rate.

The costs after taxes of one dollar of loss that can be offset by one dollar of ordinary income are listed in column 4.[12] the net cost of loss (L) of one dollar is

[12]The "loss" referred to here is the reality of the net loss. Both short-term and long-term losses are deducted to arrive at the net loss; therefore, the net loss can only be applied against ordinary income.

calculated on the following basis: Since one dollar of loss would be offset against one dollar of ordinary income which would be taxed by rate "r," the loss results in a saving of the tax on the one dollar of ordinary income. Thus, the loss (L) is equal to one dollar, less the tax which would be "r" times one dollar. The formula, then, is $L = (1\text{-}r)$.

Column 5 measures the result of losing one dollar in one period which is offset by a long-term capital gain in another period. Since the net receipts (R) of a one dollar long-term capital gain (column 3 of Table 1) exceeds the net cost of a one dollar loss (column 4 of the table) for every income bracket, there is a differential gain resulting from the two transactions. The differential gain (G) of one dollar of capital gain offset by one dollar of capital loss is equal to the net receipts of one dollar of capital gain less the net cost of one dollar of loss ($G = R\text{-}L$). Column 5 is, therefore, equal to column 3 minus column 4.

The differential gain accrues to the taxpayer after taxes; in other words, this is a money differential that he can spend. However, in order to get the true value of this gain to the taxpayer, we should know how much income he would have to earn in order to have, after taxes, an amount equal to the differential gain.

Column 6 calculates the gross income equivalent of the differential gain for each marginal tax bracket. The gross income equivalent (E) is an amount of money which after paying taxes at the marginal tax rate "r," leaves the taxpayer with a sum of money which is equal to the differential gain (G). We then have the following equations, each of which expresses the same relationship:

1. $E - Er = G$
2. $E\ (1\text{-}r) = G$
3. $E = \frac{G}{1\text{-}r}$

As indicated in column 6 of the table, the realization of one dollar of capital gain offset by one dollar of capital loss provides a differential gain of ten cents to the taxpayer in the 20 percent tax bracket. This is equivalent to his earning 12.5 cents additional income subject to his marginal tax rate. This differential gain increases with the taxpayer's income class. What is more, the gross income equivalent of the differential gain increases to the point where taxpayers in the highest income bracket find that to receive a dollar of capital gain and to lose a dollar that can be offset by ordinary income, is equal to earning $6.67 in income subject to the full tax rates.

CONCLUSION

From the investor's point of view, an investment portfolio may be viewed as a unit. However, a well-balanced diversified portfolio, of necessity, consists of a number of investments, some of which at any time may show unrealized profits while others show unrealized losses. Since gains are not taxable nor losses deductible unless realized, the taxpayer has the advantage of timing his transactions so that he may realize gains or losses at times that are most beneficial to him over the long run.

Gains and losses may be realized without much change in the composition, character, and over-all quality of the portfolio. In the latter part of every year, many stock brokerage offices compile lists of stocks that are comparable in price, earnings, dividends, growth, and safety factors. Thus, an individual who wants to realize a loss on one stock may sell that stock, realize his loss, and purchase a comparable one to replace it. To the extent of deductible losses, the taxpayer can realize gains against which no taxes can be imposed. The realized loss transaction can work in his favor in two ways. In the first place, he saves taxes on income or gains against which a tax would otherwise apply. In the second place, he reduces the cost of his investment and puts himself in a position to realize a long-term capital gain, should the market improve. The tax advantage of this is shown in column 6 of the table.

A Classified Survey of the Attitudes of the General Population Toward Dentistry: A Pilot Study*

by HAROLD C. REPPERT[1] and JOSEPH I. SHAFFER[2]

The attitude of the public towards a profession is of import to all members of that profession. To gain an indication of what some of these attitudes might be was the objective of this pilot study as planned by the Philadelphia Chapter of the American College of Dentists with the aid of the University Testing Bureau. This article reports interview findings in the areas of business practices, professional competence, non-professional aspects, and dental habits of respondents. The results of this pilot study, as herein reported, are of interest in themselves and because they demonstrate a methodology and its limitations.

THE attitudes of the general population toward dentistry are of special concern to those individuals who carry the responsibility for the problems confronting the dental profession. This is true not only for those working directly in public relations and for educators responsible for the professional training of dental students, but also for those businesses that serve the dental profession. Furthermore, the United States Bureau of the Census prediction of a population of 220 million by 1975 makes it seem urgent that a unified national program be undertaken by the dental profession in the near future to solve the problems caused by a rapidly expanding population and to insure continued high standards of dental care for our citizens.

The general purpose of this attitude survey was to provide a pilot base for a possible nationwide survey of attitudes towards dentistry; its more specific aims were to furnish some possible aid to the profession in solving certain of its immediate and long-range problems, such as public attitudes towards fees, the acceptance of dental hygienists, and the like.

The study was sponsored by the Philadelphia Section of the American College of Dentists, the Temple University School of Dentistry, and the Temple University Testing Bureau as a possible contribution to any eventual nationwide program.

PROCEDURES FOR STUDY

This study of opinions and attitudes toward dentistry was based upon questionnaire interviews of 1,000 subjects. The items for the interview questionnaire were submitted by the Philadelphia Section of the American College of Dentists and evaluated by the Temple University Testing Bureau staff. Forty-six items were finally selected for inclusion in the questionnaire.

One hundred and thirty-one members of the junior class of the Temple University School of Dentistry served as interviewers for the survey taken during the 1957 Easter vacation. The students were instructed to obtain ten interviews from five occupational groups: one from the professional, three from skilled, semi-skilled, and unskilled, one from secretarial-clerical, and one from self-employed groups, and four from housewives. These five groups were the basis of the stratified sample and were selected from a general classification of occupations.

The problems confronting the dental profession as sampled were classified into four general areas: (1) Business practices of the dentist; (2) Public attitudes toward the professional competence of the dentist; (3) Attitudes to-

*This study was made possible by the cooperation of Dean Gerald D. Timmons of the University School of Dentistry. It is based on 1,000 interviews conducted by juniors in the Temple University Dental School.

[1]Harold C. Reppert is a Professor of Psychology and Director of the Temple University Testing Bureau.

[2]Joseph I. Shaffer is an assistant in the Temple University Testing Bureau, Department of Psychology.

ward the dental profession other than its professional aspects; and (4) Dental habits of the general public. The items on the questionnaire were rated by the Testing Bureau staff, checked by members of the Dental School faculty, and then the pertinent questions were placed in the appropriate general classifications.

A total of 1,150 interviews submitted by 115 members of the junior class of Temple University School of Dentistry were coded on IBM forms. A final sample of 1,000 cases were selected (150 cases were eliminated on the basis of a table of random numbers). The occupational group distribution of the 1,000 interviews was: (1) professional—100; (2) skilled, semi-skilled, and unskilled—300; (3) secretarial-clerical—100; (4) self-employed—100; (5) housewife—400. An item count was then completed on the data and the results tabulated by staff members of the Testing Bureau.

The raw data obtained by the item-count method were converted to percentages, and a classified analysis was made according to differences within the five different occupation groups.

Population Statistics

The 1,000 persons interviewed by the Temple University junior class dental students were composed of 45.8 percent males and 54.2 percent females. The median age of the group interviewed was 36 years, with the majority (58 percent) ranging from 20 to 40 years. The persons interviewed were selected according to the previously stated five occupational groups.

The population interviewed resided mainly in Pennsylvania, (61 percent), New Jersey (24 percent), and New York (6 percent), while the remaining 7 percent lived in Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, and other states (less than 1 percent).

This was mainly an urban population: 35.8 percent were from cities over 1,000,000; 19.3 percent were from cities between 100,000 and 1,000,000; 28.3 percent from towns between 10,000 and 100,000, and 16.6 percent from towns under 10,000. (See Table 1.)

Limitations of Study

All interpretations must be made in the light of the above population statistics and in view of the results obtained by using dental students as interviewers. It may well be that an important by-product of this survey is an understanding of the biases obtained when students of a particular profession are used as interviewers in a survey of attitudes toward that profession. More specifically, the questions that may be raised are: To what extent did the dental students select friends as respondents? Do respondents selected from a highly urban population have biases in favor of the dental profession? Were the questions couched in the impartial matter-of-fact tone so necessary for an unbiased interview? These questions can only be answered by further validations against a random sample of interviewed persons obtained by professional interviewers. Furthermore, in terms of this study, a wider sampling is needed from age groups more comparable to census norms and from a more comprehensive, less urban geographic distribution of subjects.

RESULTS AND DISCUSSION

The items in the four general classifications compose about one-half of the questionnaire, and they can be discussed best in terms of group differences within the general classification. For the most part, only the more significant divergences from the percentages of the total group will be discussed. Percentages reported to three significant places are from the total population, two significant places from the occupational classifications.

Business Practices of Dentists

The data show that 78.9 percent of the total group were reminded of the necessity for periodic check-ups by their dentists, a question rated as the most significant in the area of "business prac-

Table 1

DESCRIPTION OF THE SAMPLE INTERVIEWED, BY OCCUPATION
FOR THE SURVEY OF ATTITUDES TOWARD DENTISTRY

Characteristics	Percentages of Occupational Groups[1]					
	Professional	Skilled Semi-Skilled Unskilled	Secretarial-Clerical	Self-Employed	Housewife	Total
Number Interviewed	100	300	100	100	400	1,000
Sex	100.0	100.0	100.0	100.0	100.0	100.0
Male	82	87	22	94	0	46
Female	18	13	78	6	100	54
Age	100.0	100.0	100.0	100.0	100.0	100.0
15-20	1	5	9	0	1	3
20-25	15	18	37	2	10	15
25-30	15	20	16	13	16	17
30-40	27	23	21	22	30	26
Over 40	42	35	17	63	43	40
Residence--City	100.0	100.0	100.0	100.0	100.0	100.0
Philadelphia	29	35	37	31	32	33
Other cities over 1,000,000	5	3	3	2	2	3
Cities between 100,000 and 1,000,000	18	20	17	23	19	19
Towns between 10,000 and 100,000	31	25	27	30	30	28
Towns under 10,000	17	17	16	14	17	17
Residence--State	100.0	100.0	100.0	100.0	100.0	100.0
Pennsylvania	62	61	63	57	63	61
New Jersey	22	23	23	26	26	24
New York	8	5	8	6	6	7
Maine, Vermont	2	2	1	1	1	1
Massachusetts, Connecticut	4	5	0	2	3	3
Rhode Island, New Hampshire	1	2	4	8	1	3
Other	0	3	1	0	0	1

[1]Percentages may not add to 100.0 because of rounding.

TABLE 2

PERCENTAGE OF TOTAL RESPONSE TO THOSE QUESTIONS RATED AS INDICATING ATTITUDES TOWARD "THE BUSINESS PRACTICES OF DENTISTS" (N = 1,000)

Interview Questions	Yes (1)	No (2)	Don't Know (3)	No Answer (4)	Other (5)
Does your dentist remind you of the necessity of periodic check-ups?	78.9	18.5	1.1	1.3	0.2
Do you have difficulty in getting an appointment with your dentist?	19.2	78.6	0.8	1.1	0.3
Is your dentist's office conveniently located?	85.6	13.1	0.0	1.0	0.2
Has your dentist ever referred you to another dentist for specialized work?	28.7	69.5	0.0	1.8	0.0
Is the waiting room of your dentist's office a pleasant place?	87.6	8.6	0.8	2.2	0.8
Do you consider the charages made by your dentist as being: (1) high; (2) moderate; (3) low; (4) don't know; (5) no answer[1]	21.0	65.2	8.2	4.2	1.4

[1]Responses are distributed, by percentages, in the appropriately numbered columns.

TABLE 3

PERCENTAGE OF TOTAL RESPONSE TO THOSE QUESTIONS RATED AS INDICATING ATTITUDES TOWARD "THE PROFESSIONAL COMPETENCE OF DENTISTS" (N = 1,000)

Interview Questions	Yes (1)	No (2)	Don't Know (3)	No Answer (4)	Other (5)
Do you believe that your dentist uses the most modern techniques?	74.0	7.5	16.8	1.0	0.3
Have you ever been dissatisfied with the dental care you have received?	20.7	77.8	1.0	0.4	0.1
Is your dentist one of the best in the dental field?	60.5	8.0	27.9	2.8	0.8
Do you have confidence in your dentist?	93.4	2.5	2.2	1.6	0.3
Did you feel that your dentist was at fault when you suffered pain or extreme discomfort?	16.4	55.3	21.6	1.7	4.9
Is the equipment used by your dentist: (1) quite modern; (2) fairly recent; (3) rather old; (4) don't know; (5) no answer.[1]	40.1	42.4	7.6	8.8	1.1

[1] See footnote 1, Table 2.

tices" by the Testing Bureau staff. (In all probability this is significantly higher than might have been obtained from a survey of the medical profession.) There are only minor group differences. Some 85 percent of the secretarial-clerical and 75 percent of the self-employed groups responded in the affirmative. Of the population, 18.5 percent were not informed of the necessity for checkups by their dentists.

There was a marked difference reported between the professional and self-employed groups in response to the question, "Do you have difficulty in getting an appointment with your dentist?" About 28 percent of the self-employed group reported difficulty, while only 14 percent of the professional group answered the question, "yes." Overall, 78.6 percent of the total group had no difficulty in getting an appointment. For those who reported difficulty (182 persons), six percent obviously felt less than one week was too long a period to wait. An interesting insight on the demands made of a dentist shows 36 percent reported one to two weeks, six percent three to four weeks, 16 percent more than a month, and 17 percent were uncertain in getting an appointment.

Of the total population, 85.6 percent found their dentist's office to be conveniently located; there was little difference in responses to this question among the occupational groups.

The professional group had the highest percentage of referrals for specialized work, 35 percent; the self-employed, 31 percent. The mean of 28.7 percent for the total group is an accurate estimate for the other three groups. According to the population in this study, 71 percent received all dental care from their chosen dentist.

Of the group surveyed by dental students, 87.6 percent found the waiting room of their dentist's office a pleasant place. However, the 84 percent of the skilled, semi-skilled, and unskilled group and 91 percent of the professional group represent the extreme deviations on the rating of this aspect of business practices. Some 8.6 percent went to a dentist even though they did not find the waiting room a pleasant one.

There was little deviation among the five occupational groups in response to the question, "Is your dentist prompt in keeping appointments?" The professional group reported that he was in 93 percent of the cases, the high, while the four other groups were adequately represented by the mean of 87 percent. Only 10.8 percent reported that their dentists were not prompt in keeping appointments.

Among the respondents, 65.2 percent felt that the charges made by their dentists were moderate, 21 percent considered them high, and 8.2 percent thought them low. The reported percentages were descriptive of all occupational groups. If the responses to this questionnaire are not biased, then it should be evident that the public, as represented by the survey groups, has fairly consistent opinions about dental charges, and, quite possibly, this is a reflection of acceptable standardization of fees in the profession. (See Table 2.)

The Professional Competence of Dentists

Seventy-four percent of the group interviewed believed that their dentists use the most modern techniques, while 16.8 percent answered, "don't know". Only 7.5 percent answered, "no." It should be noted that a "don't know" answer is not necessarily a criticism of the profession. There were considerable differences among the groups. Some 19 percent of the skilled, semi-skilled, and unskilled groups and 8 percent of the professional group replied, "don't know." (See Table 3.)

Subsequently, the 256 persons answering other than "yes" to this question were asked why they didn't believe their dentists used the most modern techniques. Forty-three percent didn't know, 24 percent believed that equipment was used incorrectly for they suffered extreme

discomfort, 19 percent felt their dentists used outdated equipment, and 14 percent believed their dentists were not interested in modern techniques. There were many variations among the five occupational groups. Some 29 percent of the skilled, semi-skilled, and unskilled group felt their dentists used outdated equipment, while only 13 percent of the professional group believed this to be true. On the other hand, 60 percent of the professional group gave a "don't know" or "no reply" response as compared with 23 percent for the secretarial-clerical group. It may be that the professional group believes that a question such as this requires a competent authority to answer properly. Undoubtedly, the general public does not possess objective criteria in terms of accepted professional standards with which to judge dentists on this question, but the respondents did express personal feelings to the interviewers.

Of the interviewed population, 20.7 percent were dissatisfied at some time or other with the dental care they had received. However, only 12 percent of the professional group reported dissatisfaction. Possible interpretations of these responses are of special interest to the profession. This result may represent one of the biases to be found in a study of this type. Another interpretation of this is that professional people select the best practitioners in the field, or that they are more aware of the limitations involved in what dentistry can accomplish.

Those who reported dissatisfaction (207) showed interesting group divergences. Fifteen percent of this group complained about the work being painful (0 percent of the professional group and 28 percent of the self-employed group). Poor workmanship, such as fillings falling out, was reported by 62.8 percent (83 percent of the professional group and 22 percent of the self-employed group).

Some 60.5 percent of the respondents felt their dentists were among the best in the field. The range of opinion on this question was from 73 percent of the professional group to 52 percent of the skilled, semi-skilled, and unskilled groups. However, only 8 percent definitely stated that their dentists were not among the best in the field.

Confidence in their dentists was reported by 93.4 percent of the groups. On this point the response of 98 percent of the professional group represented the high. It may be that the skilled, semi-skilled, and unskilled (91 percent with confidence) group has set lower standards and has less confidence in dental care itself. Significantly, only 2.5 percent of these occupational groups did not have confidence in their dentists. For all groups interviewed in this survey the results on this question gave an indication of an excellent attitude towards dentists.

Of the group studied, 33 percent reported suffering pain or extreme discomfort during dental treatment. Of the group so reporting, 16.4 percent felt that the dentist was at fault when pain or extreme discomfort was felt. On the other hand, 68 percent of the professional group felt the dentists were not at fault when they suffered pain as compared with the mean of 55.3 percent for the total group who thought the dentist was not at fault.

Less than half (40.1 percent) felt the equipment used by their dentists was quite modern, 42.4 percent reported the equipment as being fairly recent, while only 7.6 percent looked upon their dentists' equipment as rather old. Some 9.9 percent did not wish to pass judgment on this question. As might be expected, the professional group reported the best equipment, while the poorest rating was given by the skilled group.

An Evaluation of the Dental Profession: Non-Professional Aspects

Among the groups studied, 92.5 percent reported liking their dentists as persons, while three percent did not. Some 4.5 percent gave other answers which could not be tabulated from the reported interviews. (See Table 4.)

TABLE 4

PERCENTAGE OF TOTAL RESPONSE TO THOSE QUESTIONS RATED AS INDICATING ATTITUDES TOWARD "AN EVALUATION OF THE DENTAL PROFESSION: NON-PROFESSIONAL ASPECTS" (N = 1,000)

Interview Questions	Yes (1)	No (2)	Don't Know (3)	No Answer (4)	Other (5)
Do you like your dentist as a person?	92.5	3.0	1.9	2.5	0.1
Are dentists regarded as being among the leading professional people of your community?	78.2	4.6	16.5	0.7	0.0
Are dentists active in your community's affairs?	52.0	8.6	38.6	0.6	0.1
Would you like to be a dentist?	17.0	71.9	5.6	5.1	0.4
If you had the opportunity of becoming a dentist or a physician, which would you chose? (1) dentist; (2) physician (3) neither; (4) don't know; (5) no answer.[1]	22.3	32.3	35.4	3.2	1.8

[1] See footnote 1, Table 2.

TABLE 5

PERCENTAGE OF TOTAL RESPONSE TO THOSE QUESTIONS RATED AS INDICATING ATTITUDES OF "THE DENTAL HABITS OF THE RESPONDENTS" (N = 1,000)

Interview Questions	Yes (1)	No (2)	Don't Know (3)	No Answer (4)	Other (5)
Do you have a regular dentist who cares for your dental problems?	93.8	6.0	0.1	0.1	0.0
Have you changed dentists in the past five years?	31.6	67.7	0.1	0.6	0.0
How often have you visited your dentist in the past year? (1) once; (2) twice; (3) three times; (4) four or more times; (5) not at all.[1]	27.5	33.5	9.0	18.0	11.9
Are you uncomfortable when you think of going to a dentist?	46.4	51.5	0.6	1.1	0.4

[1] See footnote 1, Table 2.

TABLE 6

PERCENTAGE OF TOTAL RESPONSE TO THOSE QUESTIONS NOT RATED AS SUITABLE FOR INCLUSION IN RATED CLASSIFICATION (N = 1,000)

Interview Questions	Yes (1)	No (2)	Don't Know (3)	No Answer (4)	Other (5)
Would you go to a dentist who used hypnosis instead of drugs and general anesthesia?	17.3	66.2	15.0	1.4	0.1
Does your dentist usually have a nurse, dental hygienist, or secretary as an assistant?	63.8	34.8	0.3	0.6	0.0
If the answer is yes, and the dentist has a dental hygienist, then ask, "When it is necessary, do you object to having the dental hygienist clean your teeth?"	15.7	69.1	3.9	10.8	0.5
In your opinion, are there enough dentists?	42.2	33.7	22.9	1.0	0.2
Does your dentist x-ray your teeth?	77.3	20.9	0.8	0.9	0.1
If yes, then ask, "How often does your dentist x-ray your teeth?" (1) Less than once a year, (2) once a year, (3) twice a year; (4) three times a year, (5) more than three times a year.[1]	49.5	35.8	12.8	1.0	0.1
Dentists are required to take college as well as four years of training in Dental School before being permitted to practice. In terms of experience, do you think that your dental care could be handled by a person with: (1) less; (2) same; (3) more training; (4) no answer.[1]	5.6	80.6	12.1	1.7	0.0

[1] See footnote 1, Table 2.

Some 78.2 percent considered dentists as being among the leading professional people of their community. There was little variation among the five occupations in the response to this question.

When asked about their dentists' approach to community affairs, 52 percent considered them active. Again there was an interesting group divergence. Some 62 percent of the professional group but only 39 percent of the skilled, semi-skilled, and unskilled groups replied in the affirmative to this question. Only 8.6 percent did not feel that dentists were active in community affairs. It might be interesting to know what sort of community affairs the respondent had in mind. When the amount of time the average practitioner spends in practice is considered, the reported 52 percent may be an indicator of group bias. All in all, there was little difference of opinion on these questions and the reported percentages for the total are representative of those for all of the occupational groups.

Among the respondents, 17 percent felt that they might like to be dentists; 25.7 percent from the skilled, semi-skilled, and unskilled groups, but only 8 percent from among the housewives. On the other hand, 71.9 percent of those interviewed reported no desire to be a dentist.

Medicine was preferred to dentistry as a profession by the respondents to this survey. However, the percentages were by no means overwhelming. The distribution showed that 22.3 percent chose dentistry; 32.3 percent, medicine; and 35.4 percent answered "neither." The professional and self-employed groups showed slightly different attitudes in preferring medicine to dentistry by a two to one ratio. For the total group there were only minor differences of opinion shown by this classification.

This may be a significant question in indicating the bias of the sample toward dentistry. Some recent surveys have percentages showing as high as seven to one in favor of medicine.

The Dental Habits of the Respondents

Among respondents to this survey, 93.8 percent had a regular dentist: 99 percent of the professional group and 89 percent of the skilled, semi-skilled, and unskilled group fell in this category. Only 6.2 percent of the respondents did not have a regular dentist. This question also may indicate some bias since the reported 6 percent not having a regular dentist seems rather low for the national population. (See Table 5.)

Among the total group, 31.6 percent reported having changed their dentists in the last five years. Some 24.7 percent changed dentists because of dissatisfaction with dental service, 5.1 percent because of dissatisfaction with fees, and 14.6 percent because they wanted a change. In most cases it was either because the respondent moved (37 percent), or because the dentist moved (15 percent). These data should be of some significance for the dental school graduate about to open his office.

Of the group studied, 27.6 percent visited their dentists once in the past year and 33.5 percent visited their dentists twice. There is a deviation only in the professional group, 50 percent reporting having visited their dentist twice in the last year. When one considers the attitudes of the profession towards the dental habits of most people, the emphasis on seeing your dentist at least once a year, then the reported percentages seem to be higher than might have been expected.

A little over 46.4 percent of all respondents were uncomfortable at the thought of going to a dentist. Only 30 percent of the professional group felt such discomfort, while 53 percent of the housewives reported uncomfortable feelings. On the other hand, 51.5 percent of the group reported no uncomfortable feelings about going to a dentist.

Additional Evaluation of Dentists

Other questions reported in Table 6 not rated as suitable items within the four classifications discussed above re-

veal certain interesting attitudes. For example, only 17.3 percent of the respondents would go to a dentist who used hypnosis (26 percent of the professional group and 14 percent of the housewives). The reported percentage (66.2 percent) against hypnosis indicates a rather definite attitude against its use, especially so if the indication of group bias in favor of the dental profession is correct.

Among the respondents, 63.8 percent of the total population went to dentists who usually employed a nurse, a dental hygienist, or secretary as an assistant. When these 638 persons were asked if they objected to having the dental hygienist clean their teeth, 69 percent did not object while 16 percent did. It may be that the group interpreted "necessary" to mean some neglect on the part of the dentist (being too busy, etc.).

Of the group studied, 42.2 percent felt there were enough dentists. It should be noted that this is one of the few questions that had fewer than 50 percent replying in the affirmative. There is probably quite a bit of uncertainty about this question by most people, or it may be that the group interviewed wanted to assure the dental students that there was a place for them in the profession. Also 33.7 percent did not think there were enough dentists today, 22.9 percent did not know, and 1.2 percent gave another answer.

There were marked differences in the responses of the various occupational groups to the question, "Does your dentist X-ray your teeth?" Of the total group, 77.3 percent reported that their dentists X-rayed their teeth (93 percent of the professional group and 69 percent of the skilled, semi-skilled and unskilled group represent the two extremes of the five groups studied.) Of the 773 persons who reported that their dentists X-rayed their teeth, 50 percent reported that they were X-rayed less than once a year, 36 percent once a year, 13 percent twice a year, and one percent three times a year or more. There were no marked group differences.

Educational and professional training standards of less than those presently demanded were considered feasible by only 5.6 percent of those interviewed. More training was thought necessary by 12.1 percent. The same level of training was considered satisfactory by 80.6 percent. No answer to this question was given by 1.7 percent. These opinions point to the general attitude that there is a need for at least as high a standard of training as is true at the present and the possible need for higher standards in dental education. Moreover, if this group is biased in the manner noted earlier, a more accurate survey might reveal that people feel more training is desirable for dentists.

CONCLUSIONS

The attitudes of the interviewed population were, on the whole, favorable toward the dental profession.

Although the universe of this survey may have been biased in their attitudes towards the dental profession, it is probable that the group differences noted by occupation would still hold true. The only difference may be in degree. In this survey the most favorable opinions towards the profession were consistently given by the professional group followed by the self-employed groups. There were apparently no over-all significant differences among the skilled, semi-skilled, and unskilled groups or the secretarial-clerical and housewife groups. Even though one may not be able to determine specific attitudes on the basis of this survey, the fact that occupational groups do show attitude differences is of importance in terms of previously stated aims. Furthermore, one can safely conclude for future surveys of professions or occupations, biases, due to the selection of individuals to be interviewed and the social relationships involved, will be obtained if students of the professions are used as interviewers.

Philadelphia Business Index

The September 1950 issue of the Bulletin presented a new index of general business conditions in the City of Philadelphia. This series, prepared and since maintained by Robert T. Kline, was designed to reflect economic activity exclusively within the boundaries of the City of Philadelphia. It was originally based upon a combination of statistical data representing (1) industrial electric power sales; (2) indexes of employment and employee-hours; (3) department store sales[1]; (4) bank debits[2]; and (5) total construction. Because the method of reporting certain data is under revision by the originating agencies, the change in average weekly hours worked and the monthly change in total employment in the Philadelphia metropolitan area, both prepared by the Department of Research of the Federal Reserve Bank of Philadelphia, have been substituted for (2) above. This is a temporary expedient to maintain continuity of the index. The original data series will be restored after revision.

The following table presents the index for the years 1939 through 1956, and by month from November, 1956.[3]

Index of General Business Conditions, City of Philadelphia, 1947=100

Year	Index	Month	Index
1939	73	1956	
1940	77	Sept.	133.7
1941	96	Oct.	128.7
1942	99	Nov.	126.0
1943	106	Dec.	125.0
1944	106	1957[1]	
1945	98	Jan.	124.0
1946	100	Feb.	125.2
1947	100	Mar.	123.8
1948	103	Apr.	125.6
1949	97	May	129.9
1950	108	June	131.7
1951	111	July	133.6
1952	111	Aug.	135.7
1953	119	Sept.	136.2
1954	119	Oct.	131.7p[2]
1955	124	Nov.	131.0e[2]
1956	128		

p=preliminary
e=estimated. Based on currently published weekly indicators.

[1]A minor revision in the seasonal indexes has resulted in some slight changes in the 1957 monthly data.

[2]The sharp decrease evident in trend-point level for October and November is the result of declines recorded by three of the component series, Commercial Power and Light Sales, Wage Earners, and Department Store Sales. Some detail on these points follows.

Total kilowatt hours sold declined in October over September. This fact in combination with the adjustment to a daily average (there were 27 days in October, 25 days in September) had the effect of decreasing the daily average usage sharply. The number of wage earners declined by one percent from September to October. This represents the greatest decline for any one month recorded during the past year. Department store sales, after adjustments for seasonal movement and inflation, declined sharply relative to the normal seasonal pattern. Preliminary data suggest that these shifts continued in November, accounting for the lower estimate for that month.

[1]The revised index of Department Store Sales, published by the Federal Reserve Bank of Philadelphia, has been used in the composite index since October, 1951.

[2]The revised Wholesale Price Index, all commodities, published by the BLS, is used beginning January, 1952 as a deflationary index for the Bank Debit Series.

[3]Kline, Robert T., "A Measurement of General Business Conditions in the City of Philadelphia." **Economics and Business Bulletin,** Temple University School of Business and Public Administration, Philadelphia, Pa., September, 1950, pp. 33-40.